

2019 NCKU CSIE PhD Qualifying Exam

**Anatomy & Physiology for Engineering**

1. Please describe the process of transcription. [15%]
2. Please describe the process of protein synthesis. [15%]
3. Please give the Goldman equation for a cell membrane where sodium, potassium and chloride ions are involved. Please define related variables and explain the meaning of the equation. [15%]
4. Please describe formation of action potential, its stages, and saltatory conduction in human brain. [15%]
5. Please describe how a heart functions in a cardiac cycle. In a cardiac cycle, please plot ventricular pressure, ventricular volume, electrocardiogram and phonocardiogram. On the plot, please mark when heart valves open (and close) and related waveforms. [20%]
6. Please describe pulmonary circulation and body circulation. Please draw a simple anatomical diagram for each type of circulation for better explanation. [20%]